

ADVANTAGES AND DISADVANTAGES OF INTRODUCING DUAL EDUCATION IN THE  
EDUCATION PROCESS OF ENGINEERING

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**Аннотация.** Мақолада олий маълумотли малакали муҳандис кадрларни тайёрлашда касбий тайёргарлик муаммосини ҳал қилишга имкон берадиган дуал таълимнинг хусусиятлари, афзалликлари ва камчиликлари кўриб чиқилган. Дуал таълим тизими замонавий ишлаб чиқариш корхоналари фаолиятида талаб қилинадиган юқори малакали мутахассисларни тайёрлаш имконини берадиган мослашувчан ва самарали механизм эканлиги баён қилинган.

**Калит сўзлар:** ишлаб чиқариш корхоналари, дуал таълим, мослашувчан механизм, назарий ва амалий қисмлар, афзалликлар, камчиликлар.

**Аннотация.** В статье рассматриваются особенности, преимущества и недостатки дуального образования, позволяющего решить проблему профессиональной подготовки квалифицированных инженеров с высшим образованием. Утверждается, что система дуального образования является гибким и эффективным механизмом, позволяющим готовить высококвалифицированных специалистов, востребованных в деятельности современных производственных предприятий.

**Ключевые слова:** производственные предприятия, дуальное образование, гибкий механизм, теоретическая и практическая части, преимущества, недостатки.

**Abstract.** The article examines the features, advantages and disadvantages of dual education, which allows to solve the problem of professional training in the training of qualified engineers with higher education. It is stated that the dual education system is a flexible and effective mechanism that enables the training of highly qualified specialists required in the activities of modern production enterprises.

**Key words:** production enterprises, dual education, flexible mechanism, theoretical and practical parts, advantages, disadvantages.

**Introduction.** The Decree of the President of the Republic of Uzbekistan No. PF-37 dated 21.02.2024 on the State Program for the Implementation of the Strategy "Uzbekistan - 2030" was published. One of the goals set in the action plan for the direction of the Strategy "Uzbekistan - 2030" is to expand the coverage of higher education, improve the quality of training specialists with higher education, and in its implementation it is envisaged to fulfill the task of "Organizing the education system in accordance with changes in the international labor market, technological processes, and bringing the quality of education in universities to a new level." To implement such tasks, it is necessary, first of all, to review the measures and educational and methodological manuals for the training of practice-oriented engineering personnel in universities, and to improve educational programs based on the standards of prestigious universities in the world. [1].

Also, in order to introduce dual education in the Republic of Uzbekistan, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to organize dual education in the higher education system" No. 14 dated January 16, 2025 was signed and entered into force [2].

In addition, it is important to implement urgent tasks such as developing a national plan, a special program for training engineering and technical personnel in the field of renewable energy sources,

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and creating a new system for training personnel using the dual education system in higher and secondary specialized educational institutions for this sector, which will allow solving the problem of professional training in the training of qualified engineering and technical personnel with higher education in the Republic of Uzbekistan. Because the practical use of alternative energy sources is considered the most important factor in the sustainable development of the economy and increasing the competitiveness of qualified personnel. [3].

As is known, the system of training qualified personnel of higher education institutions is characterized not only by qualitative changes in the process of the education system, but also by its interaction with the spheres of production, as well as by the development of personnel competence [4].

Dual education is an infrastructure that includes the organization of professional orientation, the formation (forecasting) of personnel needs, the modernization of educational programs, the training of specialists at enterprises and educational institutions, as well as the equal responsibility of executive authorities, business associations, employers and interested parties, and provides for the qualitative training of personnel.

The dual education system involves joint financing of training programs for a specific job by commercial enterprises interested in qualified personnel and regional authorities interested in economic development and improvement of living standards in the region.

#### **Literature review and methodology**

In order to meet the needs and volume of production enterprises in qualified personnel, it is an urgent issue to further develop the education system to improve the knowledge and skills of graduates of higher education institutions. In such conditions, the most effective method is to introduce the principles of the dual education system into the system of training qualified personnel of higher education institutions. The results of the analysis of the experience of developed and advanced countries in this regard (for example, Germany, France, China, Japan, India, Great Britain, Brazil, Russia, Malaysia, etc.) show that the integration of the educational process and practice serves as the basis for high-quality training of qualified specialists in various fields of enterprises.

Speaking of the name "dual", dualism (Latin dualis - two-sided) is a doctrine that promotes the coexistence of incompatible states, principles, ways of thinking, worldviews, aspirations and epistemological principles. Dualism is one of the manifestations of pluralism. The term dualism was introduced by the German philosopher H. Wolf (1679-1754). Dualism represents the following pair of concepts: the world of ideas and the real world. Dualism can manifest itself in philosophical, religious, anthropological, ethical forms. In ancient times, religious-ethical dualism is found in the Avesta. Dualism is manifested in philosophy in the recognition of the existence of two independent things - spirit and matter. This is especially clearly seen in the views of R. Descartes and I. Kant [5,6]. Dual education can be considered as "a pedagogical activity that ensures the formation of individual knowledge and skills of students in their professional areas in vocational training" [7]. In this case, the main role is played by direct practice. L.V. Sidakova recognizes that the dual education system is "an educational system that involves the combination of educational activities of an educational institution with the activities of production enterprises" [8]. The dual education system of specialist training can be considered as "an educational system aimed at training specialists with the required level of qualifications in a specific profession, clearly coordinated between higher vocational education and employer production enterprises." [9].

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Analyzing domestic and foreign literature, the dual education system can be imagined as an educational model in which theoretical training can be carried out in educational institutions, and practical training - in production enterprises [10,11-17].

If we pay attention to the Russian experience, a vivid example of dual education can be the system created at the Moscow Institute of Physics and Technology: starting from the third or fourth year, students are involved in research work in scientific organizations [13]. Since the system worked well, it was later expanded at Novosibirsk State University [14].

The innovative labor market that has developed in the Republic of Uzbekistan requires a revision of traditional approaches to the system of professional education. The labor market needs highly qualified engineering and technical personnel who can effectively and responsibly perform their tasks and adapt to changing economic conditions. Strict professional standards require an increase in the level of training of qualified personnel in various spheres of life.

One of the means of increasing the investment attractiveness and competitiveness of regions by training workers who meet the requirements of high-tech production is the dual education system, the advantage of which is the coordinated interaction of the educational and production sectors in the training of specialists and a high level of employment of graduates.

Dual education fully meets the main principles of the competency-based approach to modern professional education (unity of theory and practice, interdisciplinary complex approach to the learning process, attention to the application of skills and knowledge in professional activities). It is advisable to introduce dual education into the educational process of professional education.

A number of problems are encountered in the process of introducing the dual education system into higher educational institutions. These problems include the inconsistency of work programs aimed at training bachelors with the sequence of seasonal work performed at production enterprises; the educational organization cannot always teach in accordance with the curriculum. The main difficulties in training personnel are primarily related to the insufficient level of readiness of the enterprise for training, namely the lack of training places at enterprises; the need for a forced increase in prices for manufactured products, the lack of funds for education in order to attract people to education; (lack of equipment, insufficient financing, etc.).

As a result of the implementation of training of specialists on the basis of dual education, it is important to note that it is important to "ensure the organization of a specific educational approach for the student". In the implementation of dual education, the educational process is based on the group of students, as well as the individualized system of dual education training based on the use of distance education in order to individualize the educational process for use and the introduction of network education mechanisms.

In order to successfully implement dual education in the higher education system, it is proposed to develop a dual education model based on cooperation between participants in the educational process. [9].

The main elements of this model are:

- legal components;
- conceptual components;
- a program for the introduction of dual education for higher education institutions;
- a personnel component.

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Each of the proposed elements mutually recognizes the other. In this case, the conceptual component is expressed in the activity of a number of technological, methodological, personal-effective levels, mechanisms and conditions of student motivation for training.

The goals of introducing the “dual education model” are as follows:

- Improving the model of training workers, taking into account the real needs of the economy in qualified personnel in order to increase the investment attractiveness of the regions;
- Developing professional standards for business and related professions;
- Developing and modernizing educational programs in accordance with the requirements of professional standards;
- Changing the mandatory requirements for the organization and content of educational programs;
- Developing a mechanism for independent assessment of workers' qualifications;
- Optimizing taxation to attract businesses to finance worker training.

The tasks of organizing dual education are as follows:

- linking the educational processes of educational institutions with the conditions of production at the enterprise (organization);
- organizing the practical part of education related to production at enterprises (organizations) and the theoretical and educational-practical part in educational institutions by turning students into participants in labor activity;
- improving the investment attractiveness of regions and improving the training of middle-level personnel, taking into account the real needs of the economy;
- developing conditions and models for cooperation between enterprises (organizations) and educational institutions;
- forming competencies by implementing educational programs in harmony with labor activity;
- improving educational programs based on the requirements of employers and technological innovations in them;
- financing the training of personnel and the implementation of educational programs;
- improving the forms and methods of cross-sector cooperation between enterprises (organizations) and educational institutions;
- to further expand the participation of enterprises (organizations) in the assessment of graduates.

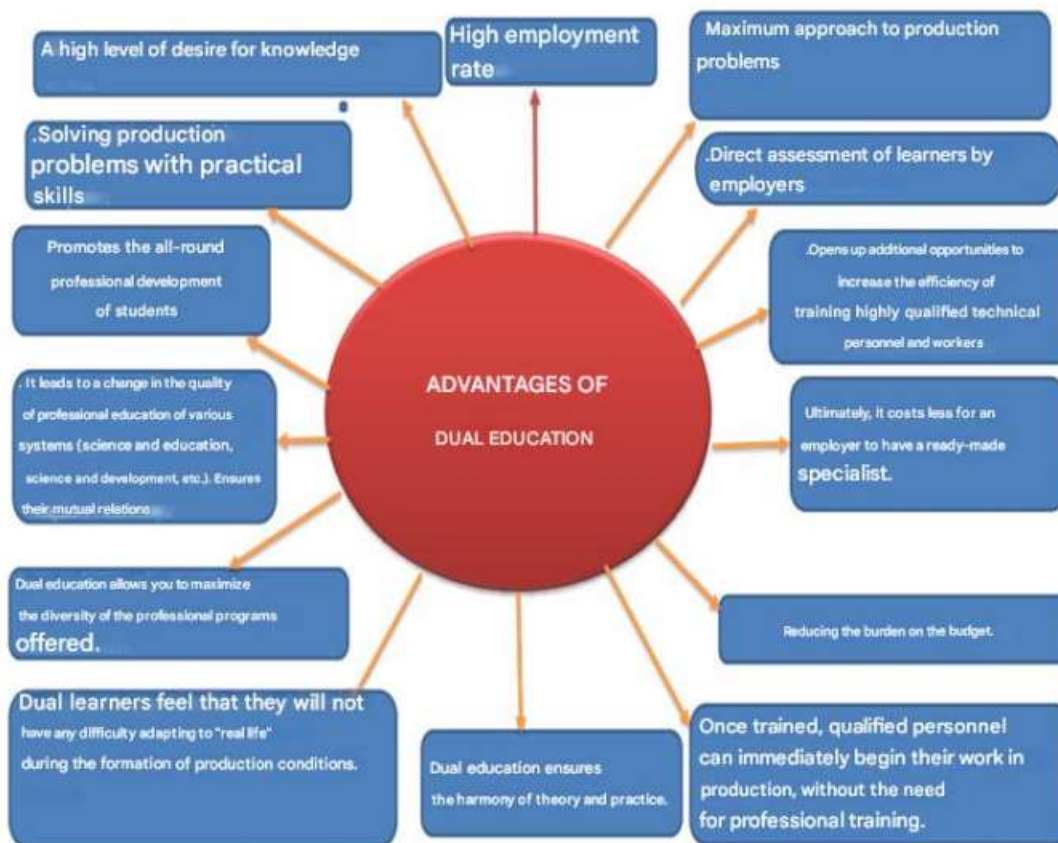
In order to effectively conduct the research and identify the advantages and disadvantages of the successful implementation of dual education, methods such as analysis of scientific and pedagogical literature on the organization of dual education, peer evaluation of the content of higher education programs, survey, comparison, and analysis were used.

#### **Research results and discussion.**

As a result of the analysis of the literature on the dual education system, it was possible to identify a large number of its possible advantages and disadvantages, which are schematically presented in Figures 1 and 2.

The advantages of the dual education system include the following groups:

1. Compatibility of education and work;
2. Parallel training by professors and qualified specialists;
3. Acquisition of theoretical and practical professional skills;
4. Obtaining a confirmed qualification after graduating from higher education institutions.



**Figure 1. Advantages of dual education.**

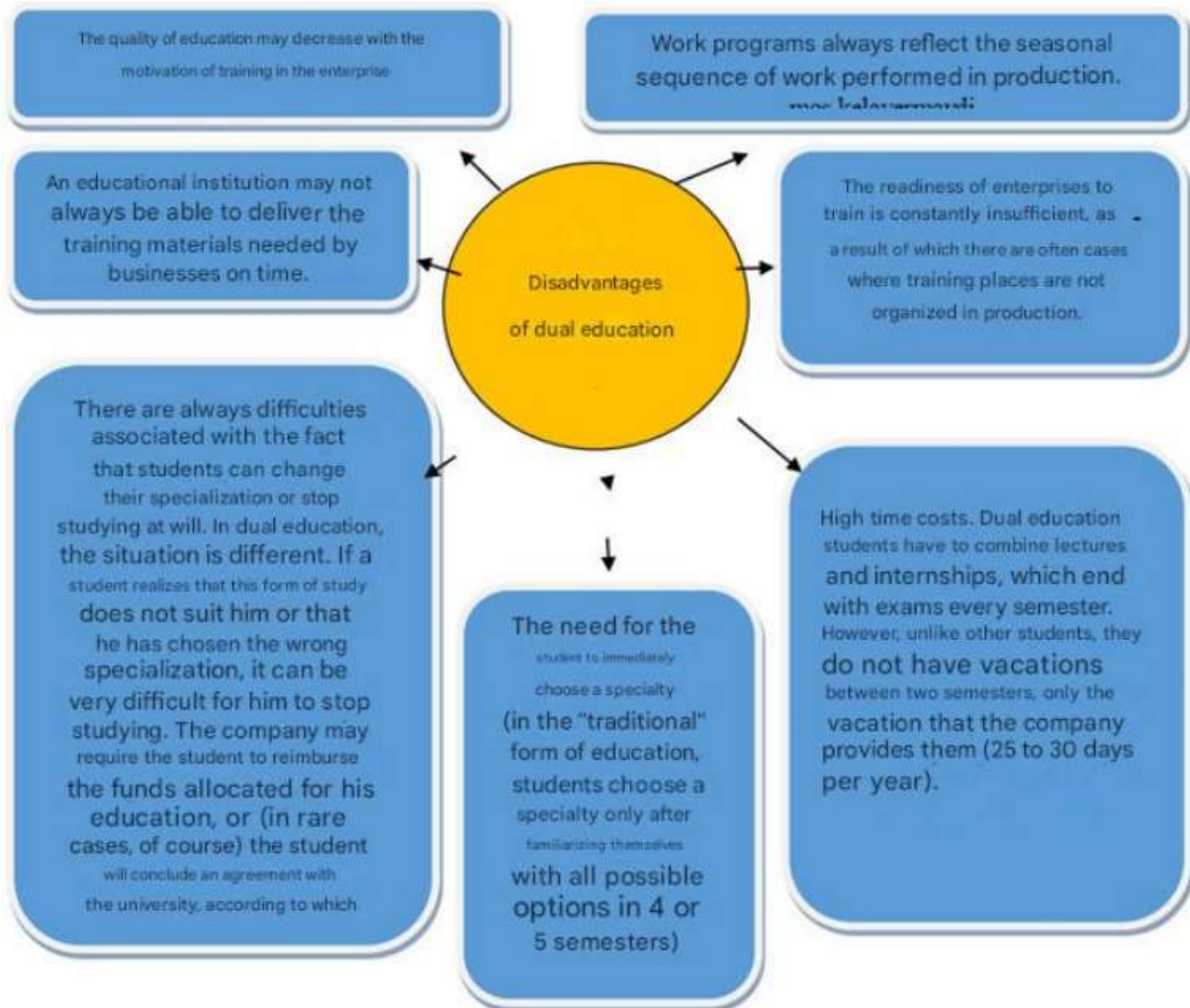
Despite the fact that dual education has its own characteristics, advantages and all its positive aspects, it is considered a flexible and effective mechanism that allows solving the problem of professional training in the training of qualified engineering and technical personnel with higher education for production enterprises, we can also point out a number of its following shortcomings:

1. The quality of education may decrease due to the motivation of training at the enterprise;
2. Work programs do not always correspond to the seasonal sequence of work performed in production;
3. The educational institution may not always be able to deliver the necessary training materials to enterprises on time;
4. The readiness of enterprises to train is constantly insufficient - as a result, there are often cases when training places are not organized in production;
5. High time costs. Dual education students must combine lectures and practice, which end with exams every semester. At the same time, unlike other students, they do not have a vacation between two semesters, but only the vacation provided by the company (25 to 30 days per year).
6. There are difficulties associated with students changing their specialty or stopping their studies at any time (In the "traditional" education system, it is usually not a problem for students to change faculties or drop out altogether. In dual education, the situation is different. If a student realizes that this form of study does not suit him or that he has chosen the wrong specialty, it can be very difficult for him to stop studying. The company may require the student to reimburse the funds allocated for his education or (in rare cases, of course) the student will conclude an agreement with the university, according to which the student must complete his studies in his chosen specialty in any case)

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7. The need for the student to immediately choose a specialty (in the "traditional" form of education, students choose a specialty only after getting acquainted with all possible options in the 4th or 5th semester);



**Figure 2.** Disadvantages of dual education.

**Conclusion.** Thus, if we talk about the concept of dual education and its application to the higher education system, it is based on strengthening the practical orientation in the training of bachelors, based on the analysis of the educational processes of a higher educational institution and production. This form of education allows you to harmonize cooperation between higher educational institutions and enterprises, and in the training of professional personnel, bachelors conduct theoretical courses and professional training directly in the workplace, ensuring their acquisition of highly qualified knowledge and the opportunity to expand their functional responsibilities.

The process of introducing dual education requires the implementation of a number of fundamental changes in the organization of educational activities; the creation of mechanisms for adequate replacement of the theoretical and practical parts of the curriculum. The dual education system is an effective and flexible mechanism for training highly qualified personnel, which is required by enterprises operating in various sectors of the market economy in modern conditions.

Dual education is an effective method of improving the quality of education. The implementation of a mechanism of interaction between educational institutions and enterprises by influencing the balance of supply and demand for labor contributes to improving the quality of personnel training, improving the situation with the employment and employment of graduates, and developing human

resources. The dual education mechanism contributes to the development of professional competencies of graduates, the formation of an active life position and the formation of a responsible person capable of productive work.

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